

Article

Public Acceptance of Renewable Energy in a Post-Socialist, Energy Import-Dependent Context: Evidence from Hungary

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Abstract

Public acceptance is a key prerequisite for renewable energy deployment, yet evidence from post-socialist, energy import-dependent countries remains limited, and acceptance is often treated as a single construct. This study examines Hungary and distinguishes between (i) general societal support for renewable energy and (ii) individual-level commitment to adoption. Using an online survey conducted in October–November 2024 ($N = 417$), we test for an acceptance gap and assess attitudinal drivers with paired-sample t -tests, OLS regression, and cluster-based comparisons. Results show a significant acceptance gap: general societal support exceeds individual-level commitment (mean difference = 0.17 on a three-point scale; Cohen's $d = 0.36$; $p < 0.001$). In bivariate terms, perceived economic benefits exhibit only a weak association with acceptance, but in multivariate models they emerge as a strong predictor of individual-level commitment ($\beta = 0.600$; $R^2 = 0.407$), whereas environmental attitudes and energy security perceptions show weaker and non-significant independent effects. Cluster analysis further indicates heterogeneous attitudinal profiles and varying levels of acceptance, suggesting that economic evaluations operate as an enabling dimension within broader attitudinal configurations rather than a standalone driver. These findings highlight why broad societal endorsement may not translate into personal engagement and imply that policy strategies should complement general pro-renewable narratives with measures that address perceived feasibility and individual-level costs and uncertainties.

Keywords: renewable energy; energy awareness; public acceptance gap; post-socialist context; energy import dependency



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1. Introduction

The transition toward renewable energy systems has become a central pillar of global and European energy policy, driven by climate change mitigation objectives, growing concerns over energy security, and increasing volatility in fossil fuel markets [1]. Renewable energy sources are widely regarded as a key instrument for reducing greenhouse gas emissions while simultaneously decreasing dependence on imported energy carriers. However, beyond technological feasibility and economic competitiveness, the large-scale deployment of renewable energy increasingly depends on social and behavioral factors, most notably public acceptance [2].

Public acceptance plays a critical role in shaping the pace and direction of energy transitions. Even when renewable energy technologies are technically mature and economically viable, opposition or ambivalence among citizens can delay, reshape, or prevent their implementation, highlighting the importance of social acceptance as a prerequisite for successful deployment [3]. Public attitudes influence political decision-making, regulatory stability, and individual adoption choices, making acceptance a central concern in energy-related social science research. Public acceptance of renewable energy is widely acknowledged as a multidimensional phenomenon shaped by environmental attitudes, perceived economic consequences, risk perceptions, and broader institutional and political contexts [4].

Despite the growing body of empirical research on renewable energy acceptance, much of the existing evidence comes from Western European countries with decentralized energy systems and relatively high levels of household autonomy [5]. As a result, the transferability of these findings to post-socialist and energy import-dependent contexts remains uncertain [6]. Moreover, previous research has often treated acceptance as a relatively uniform construct, paying limited attention to potential discrepancies between general societal support for renewable energy and individuals' willingness to engage in personal adoption or investment [7]. From a theoretical perspective, this discrepancy reflects a broader attitude–behavior gap, whereby normative or symbolic endorsement does not necessarily translate into personal commitment. In the context of renewable energy, general societal support may express value-based approval of sustainability goals, while personal commitment is shaped by perceived costs, risks, uncertainty, and feasibility constraints. Treating acceptance as a single dimension, therefore, risks obscuring important differences between symbolic endorsement and behavioral readiness. Although renewable energy acceptance has been extensively examined in Western European contexts, far less is known about how acceptance dynamics unfold in post-socialist and energy import-dependent countries. In such settings, public attitudes toward renewable energy are influenced not only by environmental considerations but also by heightened price sensitivity, structural energy dependence, and distinct institutional legacies. These contextual characteristics may alter the relative importance of perceived economic benefits, perceived risks, and energy security-related concerns in shaping acceptance patterns. Examining renewable energy acceptance in such contexts, therefore, offers an important opportunity to reassess assumptions derived from Western European experiences and to identify acceptance mechanisms that may otherwise remain obscured.

Hungary represents a particularly relevant case for examining these issues [8]. As a post-socialist country with limited domestic energy resources, Hungary exhibits a high degree of energy import dependency and a historically centralized energy policy framework [9]. In recent years, public debates on energy policy have increasingly emphasized affordability and supply security alongside environmental sustainability [10]. This combination of economic sensitivity and security-related concerns creates a setting in which broad public support for renewable energy may coexist with reluctance to make individual-level commitments or investments. Previous empirical studies examining consumer attitudes and energy-related behavior in the context of energy crises further indicate that public acceptance of renewable energy is strongly conditioned by perceptions of affordability and economic uncertainty [11]. Against this background, the present study addresses three closely related research gaps [12]. First, it provides empirical evidence on renewable energy acceptance in a post-socialist, energy import-dependent context that remains underrepresented in the international literature [13]. Second, it adopts an attitudinal perspective to disentangle the relative roles of environmental attitudes, perceived economic benefits, perceived risks, and energy security-related concerns in shaping acceptance patterns [14]. Third, and most importantly, it explicitly examines the acceptance gap between general

societal support for renewable energy and individual willingness to adopt renewable energy technologies [15]. By moving beyond a single, aggregated notion of acceptance, the analysis highlights how attitudinal heterogeneity translates into divergent forms of support and commitment [16].

By situating these findings in a post-socialist, energy-dependent context, the study contributes to the international literature on renewable energy acceptance by demonstrating how public attitudes and acceptance gaps may differ from patterns commonly observed in Western European settings. The results offer policy-relevant insights into why high levels of abstract support do not automatically translate into individual action and underscore the importance of strategies that address not only general approval but also the specific barriers to personal adoption.

2. Literature Review

As global population growth increases, energy demand is rising, a trend further amplified by rapid industrial expansion. Energy can be utilized in a variety of ways, including heating and cooling, transportation, and electricity generation. The significant economic growth of recent decades has largely been driven by the low-cost exploitation of natural resources for production and transportation [17]. Energy, therefore, plays a key role in economic development, industrial activity, and the improvement of social living conditions [18]. Since the world's total energy consumption still predominantly relies on fossil fuels, finite reserves are being depleted at an accelerating rate, making a gradual transition to renewable energy essential. The concept of renewable energy sources (RES) refers to energy sources that are virtually unlimited and regenerated by natural processes. These include bioenergy, hydropower, geothermal, solar, wind, and ocean (tidal and wave) energy. These sources possess enormous potential, as their available quantities far exceed global energy demand.

Improving energy efficiency can help mitigate growing energy demand, while renewable energy plays a crucial role in partially replacing fossil fuels [19,20]. The use of renewable energy sources also contributes to limiting the rise in global average temperatures and is essential for achieving low-carbon emissions in the future. In the short term, biomass is often considered one of the most promising solutions, as it is available in large quantities and can therefore supply a significant share of global fuel demand. Currently, hydropower and bioenergy constitute the dominant renewable energy sources worldwide; however, only a fraction of their potential is utilized, highlighting the need for their wider application. Solar energy is one of the most advantageous renewable energy sources on Earth and is currently among the most widely deployed. It can be converted into electricity relatively easily, transported efficiently, and applied in a wide range of contexts. Among renewable energy sources, wind energy is most frequently mentioned alongside solar energy. The deployment of these technologies has accelerated in recent years due to rising fossil fuel and electricity prices, which have increased the economic attractiveness of renewable solutions. Another important driver is the Russo-Ukrainian War, which has intensified concerns about energy security, particularly in the member states of the European Union. Beyond technological, economic, and geopolitical considerations, the success of renewable energy transitions increasingly depends on societal and individual acceptance of these technologies.

Public acceptance has long been identified as a critical condition for the successful deployment of renewable energy technologies [21]. Early research on renewable energy acceptance primarily focused on general public attitudes and levels of support, often assuming that positive attitudes would naturally translate into widespread adoption [22]. More recent studies challenge this assumption by demonstrating that acceptance is not a

singular construct but rather consists of multiple dimensions, including general societal support, local acceptance, and individual willingness to adopt or invest in renewable energy technologies [23].

A growing body of literature highlights the existence of an acceptance gap between abstract support for renewable energy and concrete behavioral intentions [24]. From a theoretical perspective, this gap reflects a broader attitude–behavior divide, whereby general societal support often expresses normative approval of sustainability goals, while individual-level commitment is shaped by perceived costs, risks, feasibility constraints, and personal responsibility. As a result, support for renewable energy may remain largely symbolic unless enabling conditions at the household or individual level are present. This distinction underscores the analytical importance of distinguishing between societal-level acceptance and individual-level commitment in empirical research. Recent empirical evidence suggests that this gap reflects not only individual-level attitudes but also broader institutional and contextual constraints that condition how supportive views translate into personal engagement, particularly in post-socialist and energy import-dependent settings [25]. While surveys across Europe consistently report high levels of general approval for renewable energy, individual-level commitment remains considerably lower [26]. This gap has been documented in various national contexts and is increasingly recognized as a key obstacle to energy transition processes [27]. Nevertheless, much of the existing research treats this discrepancy as a secondary observation rather than as a central analytical focus [28]. Explanations of renewable energy acceptance commonly emphasize three broad categories of factors: environmental attitudes, economic evaluations, and risk perceptions [29]. Environmental concern and climate awareness are frequently associated with higher levels of general support, particularly in Western European countries [30]. At the same time, perceived economic benefits such as cost savings, affordability, or financial returns have been shown to play a decisive role in shaping both acceptance and adoption intentions [31]. Conversely, perceived risks related to costs, reliability, or technological uncertainty often constrain support, even among individuals who express strong environmental concern [32]. Energy security has emerged as an increasingly salient theme in both academic and policy debates, particularly in energy import-dependent countries [33]. Some studies suggest that concerns about energy supply and dependency may enhance support for domestic renewable energy sources [34]. However, empirical findings remain mixed, and the role of energy security appears highly context dependent [35]. In centrally governed and post-socialist systems, security-related narratives may not straightforwardly translate into individual-level acceptance or action [36]. Importantly, the majority of empirical studies on renewable energy acceptance focus on Western European countries characterized by decentralized energy systems and higher levels of household autonomy [37]. Fewer studies examine post-socialist contexts, where historical legacies of centralized governance, regulated energy prices, and limited individual control over energy investments may shape public attitudes in distinct ways [38]. This raises questions about the generalizability of established findings and underscores the need for context-sensitive analyses.

By focusing explicitly on the acceptance gap and its attitudinal foundations in an energy-dependent, post-socialist context, the present study contributes to the literature by advancing understanding of how different forms of acceptance diverge within the same population [39] and how economic, environmental, and risk-related considerations interact in shaping renewable energy acceptance beyond Western European settings [40].

3. Materials and Methods

3.1. Data Sources

The empirical analysis is based on survey data collected through an online questionnaire designed to explore attitudes toward renewable energy and related energy policy issues. Data collection took place between October and November 2024. Participation in the survey was voluntary and anonymous, and respondents completed the questionnaire online. A total of 417 completed questionnaires were collected during the data collection period. The sampling procedure does not allow the dataset to be considered nationally representative. Consequently, the analysis focuses on identifying patterns and associations within the observed sample rather than drawing population-level inferences. The analytical sample includes respondents with complete information on the variables used in the analysis. Missing values were handled using listwise deletion.

The dataset provides sufficient variability across key attitudinal variables to support comparative and multivariate statistical analysis. No post-stratification weighting or correction procedures were applied.

3.2. Acceptance Measures and Analytical Sample

The primary dependent variables of the analysis are two distinct measures of renewable energy acceptance. General societal support for renewable energy captures respondents' approval of renewable energy development at an abstract, societal level, while individual-level commitment reflects willingness to personally adopt or invest in renewable energy solutions. This distinction is central to the analytical framework of the study and provides the empirical basis for examining the existence and magnitude of an acceptance gap between general support and individual engagement.

The analytical sample was constructed to ensure that both acceptance measures and all attitudinal variables relevant to the hypotheses were available for each respondent. Prior to analysis, the dataset was screened for missing values across acceptance measures and explanatory variables, including perceived economic benefits, perceived risks, environmental attitudes, and energy security-related considerations. Respondents with missing values on any of these variables were excluded using listwise deletion. This procedure ensured that all descriptive analyses, regression models, and cluster analyses were conducted on an identical set of observations, allowing for direct comparison across analytical steps and across acceptance dimensions. Descriptive statistics indicate that the sample is sufficiently heterogeneous to support hypothesis-driven analysis. General societal support for renewable energy shows relatively high average levels, while individual-level commitment displays substantially greater dispersion across the response scale. This pattern provides an empirical foundation for Hypothesis 1, which assumes a systematic difference between abstract support and personal commitment. At the same time, the attitudinal variables included in the analysis display meaningful variation across respondents, a necessary condition for evaluating Hypotheses 2 and 3 concerning the relative role of economic, environmental, risk-related, and energy security-related attitudes in shaping renewable energy acceptance. No pronounced floor or ceiling effects were observed for any of the acceptance measures or attitudinal indices. The distributions of the variables do not indicate extreme skewness or kurtosis that would undermine the application of linear regression techniques or cluster-based segmentation. These characteristics support the suitability of the data for examining both continuous associations and group-level differences in acceptance patterns.

All analyses are based on unweighted data. No weighting or post-stratification adjustments were applied, reflecting the non-representative nature of the sample and the analytical objective of examining relationships and patterns within the observed data rather than producing population-level estimates. Consequently, the results should be

interpreted as describing acceptance-related differences and attitudinal mechanisms within the analytical sample. This limitation is particularly relevant for the interpretation of Hypothesis 3, as the findings are intended to provide analytical insights into the structure of renewable energy acceptance rather than to support population-level generalization.

3.3. Statistical Methods

To examine variation in renewable energy acceptance and to assess the role of attitudinal factors, the analysis combined descriptive statistics, one-way analysis of variance, ordinary least squares regression models, and cluster analysis. The statistical strategy was explicitly aligned with the proposed hypotheses and with the analytical distinction between general societal support for renewable energy and individual-level commitment. Descriptive statistics were used to summarize the distribution of acceptance measures and key attitudinal variables. Mean values and standard deviations were examined to characterize levels of general societal support and individual-level commitment. The descriptive results show that average levels of societal support exceed those of individual-level commitment, indicating the presence of an acceptance gap within the sample and providing motivation for subsequent inferential analyses. Differences in renewable energy acceptance across attitudinally defined groups were assessed using one-way analysis of variance (ANOVA). This approach was applied to test whether acceptance varied significantly across acceptance-based clusters and across categories reflecting perceived economic conditions. The one-way ANOVA evaluates whether between-group variance exceeds within-group variance and can be expressed as:

$$F = \frac{MS_{between}}{MS_{within}} \quad (1)$$

where $MS_{between}$ denotes the mean square between groups and MS_{within} presents the error variance within groups. The ANOVA results indicate statistically significant differences in acceptance levels across several groupings, with F statistics reaching conventional significance thresholds. These findings confirm that renewable energy acceptance is not homogeneous across the sample. To quantify the magnitude of group differences, effect sizes were assessed using eta squared (η^2), calculated as:

$$\eta^2 = \frac{SS_{between}}{SS_{total}} \quad (2)$$

To interpret the effect sizes, we applied Cohen's [41] benchmarks:

$\eta_p^2 \approx 0.01 \rightarrow$ small effect;

$\eta_p^2 \approx 0.06 \rightarrow$ medium effect;

$\eta_p^2 \geq 0.14 \rightarrow$ large effect.

Effect sizes were interpreted using Cohen's [41] benchmarks, where values around 0.01 indicate small effects, values around 0.06 medium effects, and values of 0.14 or higher large effects. The observed effect sizes are generally small to medium, indicating that group membership explains a meaningful but limited share of variance in acceptance.

Third, ordinary least squares (OLS) linear regression models were estimated to examine associations between attitudinal variables and renewable energy acceptance. Separate models were specified for general societal support and for individual-level commitment. The explanatory variables included perceived economic benefits, perceived risks, environmental attitudes, and energy security-related considerations. The general form of the regression model is:

$$Y_i = \beta_0 + \beta_1 EP_i + \beta_{21} EA_i + \beta_3 RISK_i + \beta_4 ES_i + \epsilon_i \quad (3)$$

where Y_i denotes the acceptance outcome for individual i , EP_i represents perceived economic benefits, EA_i environmental attitudes, $RISK_i$ perceived risks, ES_i energy security-related considerations, and ε_i is the error term.

Regression results show modest explanatory power, as reflected in low R-squared values. Perceived economic benefits exhibit a positive association with acceptance, while perceived risks show a negative association. In contrast, energy security-related variables do not display statistically significant direct effects on acceptance. These patterns are consistent across model specifications and indicate that economic and risk-related considerations play a more prominent role than energy security perceptions in explaining variation in renewable energy acceptance.

Finally, k -means cluster analysis was applied to identify distinct attitudinal profiles within the sample. The clustering procedure was based on standardized attitudinal indices and aimed to minimize within-cluster variance, formally expressed as:

$$\sum_{k=1}^K \sum_{i \in C_k} \sum_j (Z_{ij} - \bar{Z}_{kj})^2 \quad (4)$$

where Z_{ij} denotes the standardized score of individual i on attitudinal dimension j , C_k represents cluster k , and $\bar{Z}_{kj}$ is the cluster mean. Comparisons across clusters reveal systematic differences in both general societal support and individual-level commitment, including variation in the magnitude of the acceptance gap across attitudinal profiles.

Throughout the analysis, hypotheses were evaluated by jointly considering statistical significance ($p < 0.05$) and effect sizes, following standard recommendations in the literature. All statistical analyses were conducted using IBM SPSS Statistics version 29.

3.4. Measurement of Renewable Energy Acceptance

Renewable energy acceptance was operationalized through a multidimensional measurement approach that distinguishes between societal-level acceptance and individual-level commitment. This distinction reflects the assumption that general approval of renewable energy as a collective goal does not necessarily translate into personal willingness to engage in adoption-related actions, particularly in contexts characterized by economic uncertainty and centralized energy governance. General societal acceptance of renewable energy was captured through a composite index reflecting respondents' overall approval of societal-level renewable energy development. The items underlying this index focused on evaluations of renewable energy expansion as a desirable direction for national energy policy and on perceptions of renewable energy as a collectively beneficial solution to energy-related challenges. This dimension reflects normative and symbolic acceptance rather than behavioral intention. Individual-level acceptance, in the form of personal commitment, was operationalized as a separate composite index reflecting respondents' stated willingness to take personal actions related to renewable energy adoption or investment, such as household-level implementation or financial participation. This dimension captures a more concrete form of acceptance that involves perceived costs, risks, and personal responsibility.

Both acceptance indices were constructed by averaging item-level responses recorded on identical three-point Likert-type scales ranging from 1 (low acceptance) to 3 (high acceptance). Higher values indicate stronger acceptance. The use of identical scaling ensures direct comparability between the two acceptance dimensions and enables the systematic assessment of divergence between societal-level acceptance and individual-level commitment. To explicitly capture this divergence, an acceptance gap indicator was calculated as the difference between general societal acceptance and individual-level commitment. Positive values indicate stronger societal-level acceptance relative to personal commitment, whereas values close to zero indicate alignment between the two dimensions. Negative values reflect cases in which individual-level commitment exceeds societal-level

acceptance. This indicator provides the empirical basis for identifying acceptance gaps and for examining their attitudinal correlates in subsequent analyses.

3.5. Hypothesis Testing

In this study, three central hypotheses were examined:

H1. *Acceptance gap between general support and individual-level commitment: General societal support for renewable energy is significantly higher than individual-level commitment to renewable energy adoption.*

This hypothesis was motivated by the observation that renewable energy often enjoys broad public approval at an abstract, societal level, while willingness to adopt or invest personally remains more limited. Previous research suggests that this divergence reflects structural and attitudinal constraints that prevent abstract support from translating into concrete individual action.

To test this hypothesis, differences between general societal support and individual-level commitment were examined using descriptive statistical analysis and paired samples *t*-tests. In addition, group-level differences were explored using one-way analysis of variance (One-Way ANOVA) to assess variation in acceptance across attitudinal groups. The hypothesis was evaluated based on the statistical significance, magnitude, and consistency of differences between the two acceptance measures.

H2. *Conditional influence of economic and energy security considerations: Perceived economic benefits and energy security-related considerations do not exert uniformly strong independent effects on renewable energy acceptance across attitudinal contexts. The rationale for this hypothesis was based on the assumption that although economic narratives and energy security concerns are frequently emphasized in energy policy discourse, their influence on public acceptance may be conditional on broader attitudinal contexts. In particular, environmental attitudes and perceived risks may shape acceptance in conjunction with economic evaluations, rather than economic and security considerations operating as universal, standalone drivers.*

To evaluate this hypothesis, ordinary least squares linear regression models were estimated with individual-level commitment to renewable energy as the primary dependent variable. Perceived economic benefits, perceived risks, environmental attitudes, and energy security-related considerations were included as explanatory variables. Hypothesis testing focused on the statistical significance, direction, and magnitude of the regression coefficients within a multivariate framework.

H3. *Attitudinal heterogeneity in renewable energy acceptance: Renewable energy acceptance differs significantly across attitudinal profiles.*

This hypothesis was grounded in the expectation that public attitudes toward renewable energy are not homogeneous but cluster into distinct configurations characterized by different combinations of economic, environmental, and risk-related considerations. These attitudinal profiles are expected to exhibit systematically different levels of acceptance and varying degrees of divergence between general support and individual-level commitment. To test this hypothesis, cluster analysis was applied using standardized attitudinal indices as input variables. Differences in renewable energy acceptance across the resulting clusters were examined using one-way analysis of variance. The hypothesis was evaluated based on statistically significant differences in acceptance measures across attitudinal profiles.

Across all three hypotheses, statistical inference was based on established inferential techniques, including descriptive analysis, paired samples *t*-tests, one-way analysis of variance, cluster analysis, and linear regression models. Hypotheses were evaluated by jointly considering statistical significance and substantive effect patterns, in line with standard practice in empirical social science research.

4. Results

The empirical analysis provides an opportunity to examine how public acceptance of renewable energy is structured and differentiated across multiple attitudinal dimensions. As described in the Materials and Methods section, the analysis combines descriptive statistics, one-way analysis of variance, ordinary least squares regression models, and cluster analysis to evaluate the proposed hypotheses. The empirical context of the analysis is characterized by heightened energy price volatility, the increased salience of energy security considerations, and ongoing public and policy debates related to the energy transition. These contextual factors form an important backdrop for understanding public attitudes toward renewable energy and the potential divergence between abstract support and individual-level engagement. The analysis is explicitly organized around three interrelated hypotheses reflecting the multidimensional conceptualization of renewable energy acceptance adopted in this study. The first hypothesis (H1) addresses the existence of an acceptance gap between general societal support for renewable energy and individual-level commitment to adoption or investment. This hypothesis focuses on whether abstract approval of renewable energy as a collective goal systematically exceeds willingness to engage in personal action. The second hypothesis (H2) examines the role of perceived economic benefits in shaping renewable energy acceptance, with particular emphasis on individual-level commitment, and is assessed primarily through multivariate regression analysis using continuous attitudinal measures. The third hypothesis (H3) focuses on heterogeneity in renewable energy acceptance by identifying distinct attitudinal profiles through cluster analysis and by testing differences in general societal acceptance across these profiles using group-level comparisons.

The presentation of results follows this analytical logic. First, descriptive and inferential evidence is used to document the acceptance gap between abstract societal support and individual-level commitment, providing an empirical test of H1. Second, cluster-based analyses are employed to demonstrate systematic heterogeneity in acceptance patterns and to situate general societal acceptance within broader attitudinal configurations, addressing H3. Finally, regression results are reported to assess the independent association between perceived economic benefits and individual-level commitment to renewable energy adoption, thereby evaluating H2. This stepwise structure enables a coherent and evidence-based interpretation of how different attitudinal dimensions jointly shape public acceptance of renewable energy while maintaining a clear distinction between societal-level support and individual-level engagement.

4.1. The Acceptance Gap Between General Societal Acceptance and Individual-Level Commitment

To empirically assess the presence of an acceptance gap between general societal acceptance of renewable energy and individual-level commitment to adoption or investment, descriptive statistics and paired-sample comparisons were conducted using the two acceptance indices defined in Section 3.4. General societal acceptance captures respondents' abstract approval of renewable energy development at the collective level, whereas individual-level commitment reflects their willingness to take personal actions related to renewable energy adoption. This analytical distinction provides the empirical basis for testing Hypothesis 1. Table 1 reports the mean values and standard deviations for

both acceptance dimensions, together with the acceptance gap calculated as the difference between general societal acceptance and individual-level commitment.

Table 1. General societal acceptance and individual-level commitment to renewable energy.

Acceptance Dimension	Mean	SD
General societal acceptance	2.49	0.58
Individual-level commitment	2.32	0.49
Acceptance gap (societal–individual)	0.17	0.47

Note: The table reports descriptive statistics (means, standard deviations, and observed ranges) for general societal acceptance and individual-level commitment to renewable energy. Higher values indicate stronger acceptance or commitment. [Source: Own elaboration based on survey data (N = 417)].

As shown in Table 1, general societal acceptance of renewable energy exceeds individual-level commitment, indicating a systematic divergence between the two acceptance dimensions. This difference is statistically significant, as confirmed by a paired-samples *t*-test ($t(216) = 5.37, p < 0.001$). The mean difference amounts to 0.17 scale points (95% CI [0.11, 0.23]), and the corresponding effect size (Cohen's $d = 0.36$) indicates a small-to-moderate but substantively meaningful acceptance gap. In addition to differences in mean levels, the distribution of the acceptance gap shows substantial heterogeneity across respondents. The relatively large standard deviation of the gap ($SD = 0.47$) indicates that, although societal acceptance exceeds individual-level commitment on average, the magnitude of this divergence varies considerably within the sample. This variation suggests that the acceptance gap is not uniform across individuals but reflects differentiated patterns of engagement and reluctance toward renewable energy adoption.

The positive direction of the acceptance gap implies that support for renewable energy is more readily articulated at the collective level than translated into personal action. This asymmetry highlights the analytical relevance of distinguishing between abstract societal endorsement and individual-level commitment, as the two dimensions capture related but non-identical aspects of public acceptance. By documenting both the statistical significance and the internal heterogeneity of the acceptance gap, the results provide an empirical basis for examining the attitudinal mechanisms that shape individual-level commitment and for understanding why similar levels of societal support may correspond to markedly different degrees of personal engagement in subsequent analyses.

4.2. Attitudinal Clustering of Renewable Energy Acceptance

To examine heterogeneity in renewable energy acceptance across attitudinal profiles, cluster analysis was applied using standardized indices of environmental attitudes, perceived economic benefits, perceived energy security, and general societal acceptance of renewable energy. This approach addresses Hypothesis 3 by identifying whether acceptance is structured by distinct configurations of underlying attitudes rather than by isolated attitudinal dimensions. The clustering procedure resulted in three clearly distinguishable attitudinal profiles. The first cluster is characterized by consistently high values across environmental attitudes, perceived energy security, and general societal acceptance of renewable energy. Respondents in this cluster express strong normative support for renewable energy and perceive substantial strategic benefits related to long-term energy security. Perceived economic benefits are also relatively high, though less pronounced than environmental and security-related considerations. The second cluster exhibits a more differentiated attitudinal structure. Environmental attitudes and perceived energy security remain relatively strong, while perceived economic benefits are notably lower, suggesting intermediate levels of general societal acceptance. The third cluster is characterized by comparatively weaker environmental attitudes, lower perceived economic benefits, and

limited perceived gains in energy security. General societal acceptance is lowest in this group. These cluster-level patterns are illustrated in Figure 1, which presents mean values for environmental attitudes, perceived economic benefits, perceived energy security, and general societal acceptance across the three clusters.

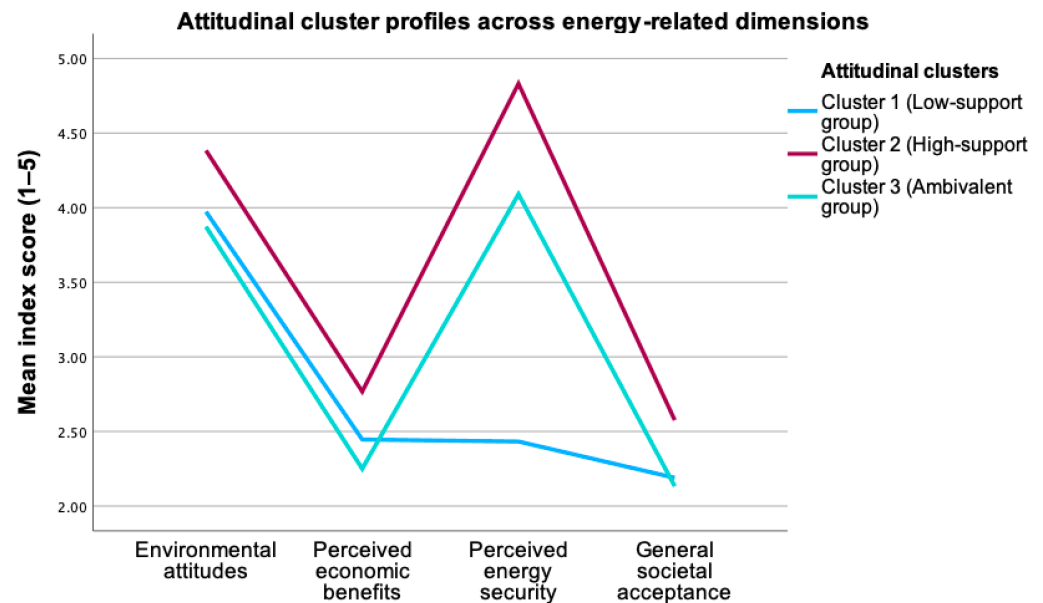


Figure 1. Attitudinal cluster profiles across energy-related dimensions. Note: The figure displays mean index scores (1–5) for environmental attitudes, perceived economic benefits, perceived energy security, and general societal acceptance of renewable energy across the three identified attitudinal clusters (Cluster 1: Low-support group; Cluster 2: High-support group; Cluster 3: Ambivalent group). Values represent cluster-level averages and are shown for descriptive comparison across dimensions. [Source: Own elaboration based on survey data (N = 417)].

The attitudinal differentiation illustrated in Figure 1 reveals a structured and nonrandom pattern of renewable energy acceptance across the identified clusters. Differences in acceptance are not attributable to a single attitudinal dimension but emerge from the combined configuration of environmental attitudes, perceived energy security, and perceived economic benefits. Clusters characterized by similarly high levels of environmental concern nevertheless display markedly different acceptance levels, depending on how economic and energy security considerations are evaluated. This indicates that environmental orientation alone is insufficient to account for variation in acceptance. Figure 1 further shows that perceived economic benefits do not separate clusters in a decisive or linear manner. Although economic evaluations vary across clusters, the strongest contrasts in acceptance coincide with differences in environmental attitudes and perceived energy security rather than with economic perceptions alone. This pattern suggests that economic considerations primarily serve as a conditioning factor within broader attitudinal configurations, rather than as a dominant, standalone driver of acceptance. Accordingly, high perceived economic benefits do not automatically translate into high levels of acceptance when environmental or security-related motivations are comparatively weak.

The visual patterns observed in Figure 1 provide substantive empirical support for Hypothesis 3 by indicating that renewable energy acceptance is embedded in multidimensional attitudinal constellations rather than determined by isolated beliefs. At the same time, the figure-based evidence motivates the use of inferential statistical testing to assess whether the observed cluster-level differences in acceptance are statistically significant, which is addressed in the subsequent analysis using one-way analysis of variance. To facilitate direct comparison across attitudinal dimensions measured on different scales

and to assess the robustness of the observed cluster structure, standardized cluster means were also examined. The standardized representation presented in Figure 2 reinforces the patterns observed in the raw score profiles and confirms the internal consistency of the cluster solution. Standardization highlights that environmental attitudes and perceived energy security exhibit the strongest differentiation between clusters, whereas perceived economic benefits vary more gradually and contribute less sharply to cluster separation at the level of acceptance.

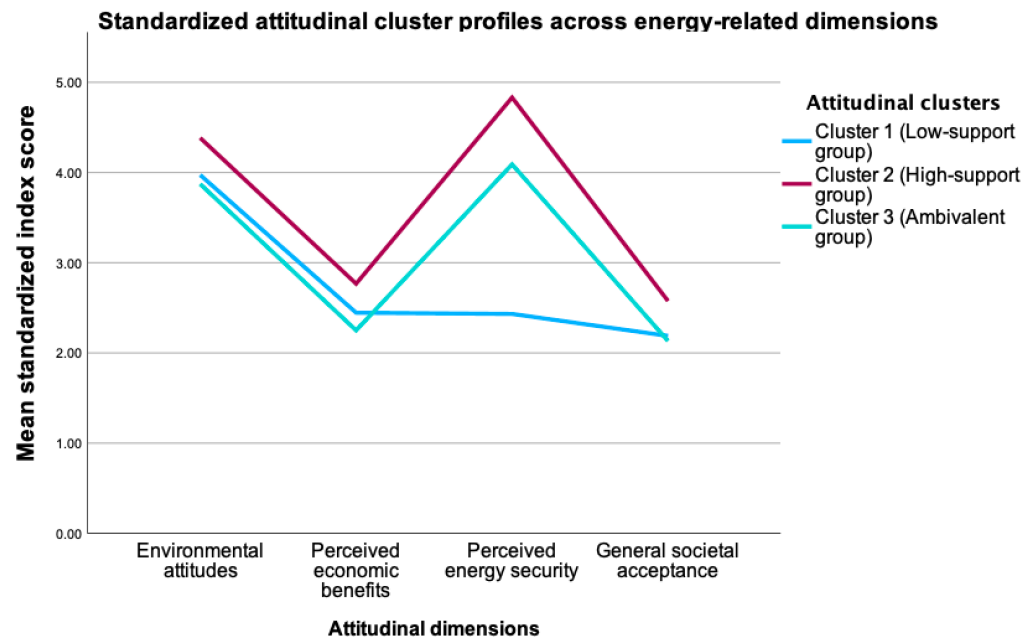


Figure 2. Standardized attitudinal cluster profiles across energy-related dimensions. Note: The figure presents standardized mean index scores for environmental attitudes, perceived economic benefits, perceived energy security, and general societal acceptance across the three attitudinal clusters. Standardization is applied to facilitate comparison across dimensions measured on different scales and to assess the robustness of the cluster solution. [Source: Own elaboration based on survey data (N = 417)].

The combined interpretation of Figures 1 and 2 indicates a structured and nonrandom pattern of renewable energy acceptance across the identified clusters. Differences in acceptance arise from the interaction of multiple attitudinal dimensions rather than from isolated beliefs. Clusters characterized by similarly great environmental concern nevertheless display substantially different acceptance levels depending on how energy security considerations are evaluated. These visual patterns provide further empirical support for Hypothesis 3 and motivate the subsequent inferential analysis, which assesses whether the observed cluster-level differences in acceptance are statistically significant and is examined in the following section using one-way analysis of variance.

4.3. Acceptance Differences Across Attitudinal Clusters

To examine whether the attitudinal differentiation identified in the previous section translates into statistically significant differences in renewable energy acceptance, a one-way analysis of variance was conducted with general societal acceptance as the dependent variable and cluster membership as the grouping factor. This analysis directly tests Hypothesis 3, which posits that acceptance of renewable energy varies systematically across attitudinal clusters. The results indicate a statistically significant effect of cluster membership on renewable energy acceptance ($F(2, 214) = 9.435, p < 0.001$). The magnitude of the effect is moderate ($\eta^2 = 0.081; \omega^2 \approx 0.072$), indicating that attitudinal clustering explains

a non-trivial share of the variance in acceptance. Descriptive statistics further clarify the structure of these differences. Mean acceptance levels range from 3.17 (SD = 1.31) in Cluster 1 to 3.88 (SD = 0.81) in Cluster 2, while Cluster 3 exhibits a mean acceptance level of 3.24 (SD = 1.33). Post hoc comparisons using both Tukey and Bonferroni corrections indicate that Cluster 2 differs significantly from both Cluster 1 (mean difference = 0.71, $p < 0.001$) and Cluster 3 (mean difference = 0.63, $p < 0.05$), whereas no statistically significant difference is observed between Cluster 1 and Cluster 3. In addition to differences in mean acceptance levels, clusters also differ in the dispersion of acceptance scores. Cluster 2 exhibits comparatively lower variability, whereas Clusters 1 and 3 display higher dispersion. Figure 3 presents the distribution of general societal acceptance across the identified attitudinal clusters and provides a visual comparison of these distributions.

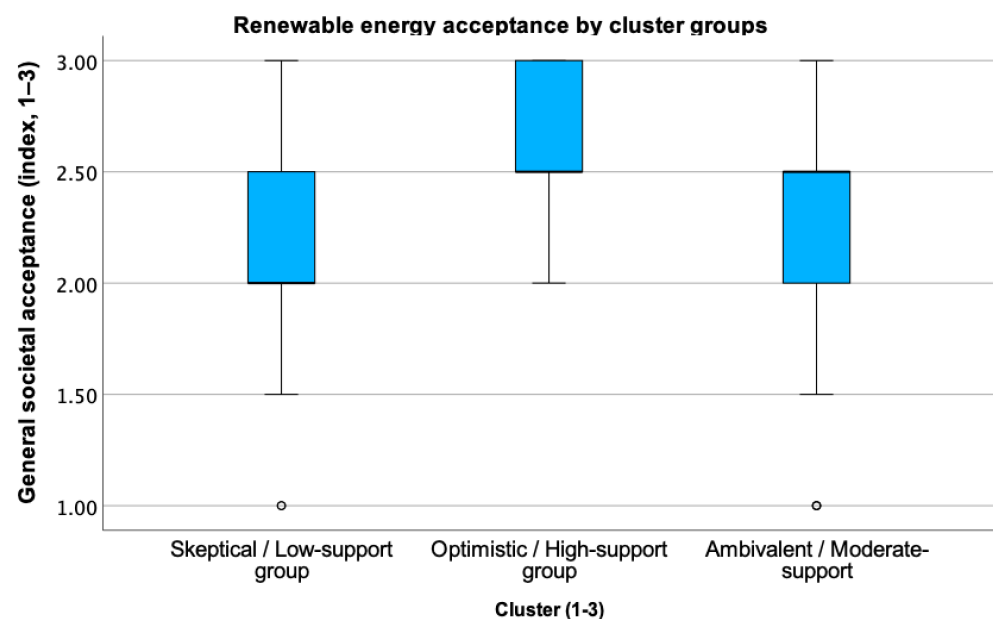


Figure 3. General societal acceptance across attitudinal clusters. Note: Boxplots illustrate the distribution of general societal acceptance (index range: 1–3) within each attitudinal cluster. Boxes represent interquartile ranges, horizontal lines indicate medians, and whiskers denote the range of observed values. The figure provides a descriptive comparison of acceptance levels across clusters. [Source: Own elaboration based on survey data (N = 417)].

As shown in Figure 3, Cluster 2 exhibits the highest median level of general societal acceptance, while Clusters 1 and 3 display lower and relatively similar distributions. The interquartile ranges of Cluster 2 show limited overlap with those of the other clusters, whereas substantial overlap is observed between Clusters 1 and 3. This distributional pattern is consistent with the post hoc test results, which indicate statistically significant differences between Cluster 2 and both Cluster 1 and Cluster 3, but no statistically significant difference between Cluster 1 and Cluster 3.

4.4. Perceived Economic Benefits and the Limits of Renewable Energy Acceptance

This section examines whether perceived economic benefits independently explain renewable energy acceptance, addressing Hypothesis 2. Economic considerations are frequently emphasized in policy discourse as central drivers of public support for renewable energy. However, the cluster-based analyses presented in the previous sections indicate that acceptance is embedded within broader attitudinal configurations rather than driven by single factors. The following analysis, therefore, evaluates the explanatory role of economic perceptions in a focused, hypothesis-driven manner, combining regression results with

figure-based evidence. To assess the association between perceived economic benefits and renewable energy acceptance, an ordinary least squares regression model was first estimated in a bivariate specification, with individual-level commitment to renewable energy adoption as the dependent variable. The results indicate a weak positive association ($\beta = 0.092$, $p = 0.175$). The explanatory power of this model is minimal, with perceived economic benefits accounting for less than one percent of the variance in individual-level commitment ($R^2 = 0.009$). This result indicates that economic considerations alone provide limited explanatory power for individual-level renewable energy acceptance. The nature of this weak bivariate relationship is illustrated at the individual level in Figure 4, which depicts the association between perceived economic benefits and individual-level commitment. The dispersion of observations indicates substantial variation in acceptance across the full range of economic evaluations, suggesting that similar perceptions of economic benefit may correspond to markedly different levels of individual engagement. When multiple attitudinal dimensions are examined jointly, a different pattern emerges. A multivariate ordinary least squares regression model was estimated, including perceived economic benefits, environmental attitudes, and energy security-related considerations as explanatory variables. The dependent variable in this model is individual-level commitment to renewable energy adoption. The results of this analysis are reported in Table 2.

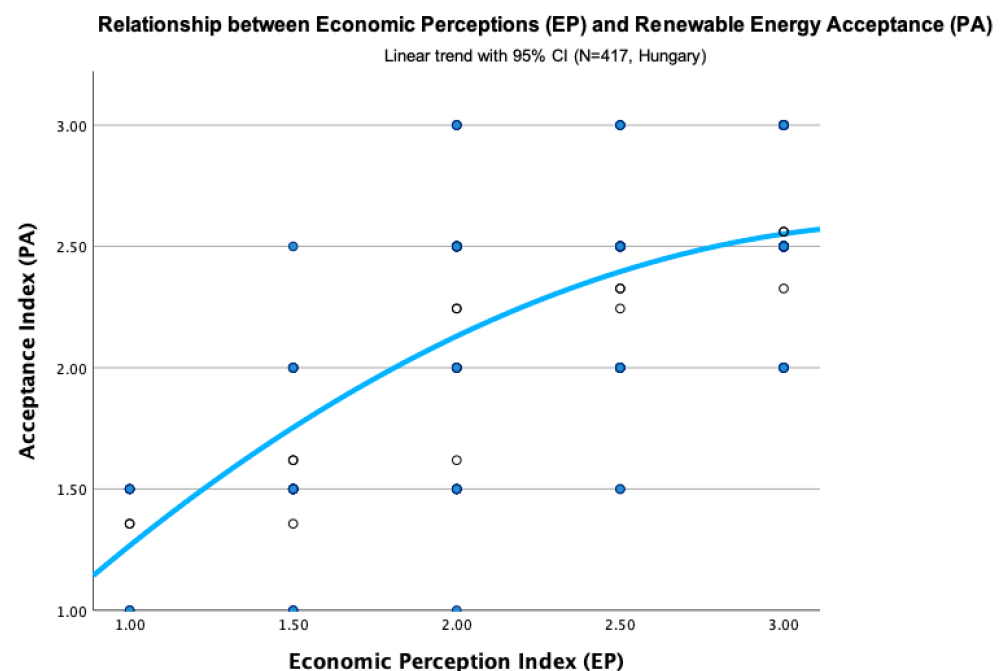


Figure 4. Economic perceptions and individual-level commitment to renewable energy. Note: Dots represent individual observations. Differences in marker color and fill (filled vs. hollow circles) reflect default graphical rendering in SPSS to reduce visual overlap and do not indicate substantively different groups. The solid line depicts a locally weighted (LOESS) smoothing of the relationship between perceived economic benefits and general societal acceptance. The figure is intended for illustrative purposes and does not imply causality. [Source: Own elaboration based on survey data (N = 417)].

As shown in Table 2, perceived economic benefits are a strong, statistically significant predictor of individual-level commitment to renewable energy adoption ($\beta = 0.600$, $p < 0.001$). By contrast, environmental attitudes and energy security-related considerations do not exhibit statistically significant independent effects after controlling for economic evaluations. The multivariate regression model explains a substantial share of the variance in individual-level commitment ($R^2 = 0.407$; adjusted $R^2 = 0.398$) and is statistically sig-

nificant overall ($F(3, 213) = 48.64, p < 0.001$). The Durbin–Watson statistic (1.77) indicates no substantial autocorrelation in the residuals. The contrast between the weak bivariate association and the strong multivariate effect of perceived economic benefits suggests that economic considerations do not operate as a universal, standalone driver of acceptance. Instead, their explanatory power emerges within a broader attitudinal framework that jointly considers multiple dimensions. This pattern is consistent with the earlier cluster-based evidence and clarifies why perceived economic benefits exert a conditional rather than an unconditional influence on individual-level renewable energy acceptance. To clarify how the weak bivariate association between perceived economic benefits and individual-level commitment is reflected at the level of individual observations, the distribution of responses is examined graphically in Figure 4.

Table 2. Determinants of individual-level commitment to renewable energy adoption (OLS regression).

Predictor	<i>B</i>	Std. Error	β	<i>p</i> -Value
Perceived economic benefits	0.511	0.046	0.600	< 0.001
Environmental attitudes	0.050	0.028	0.097	0.078
Energy security perceptions	0.030	0.028	0.058	0.283
Constant	0.718	0.172	-	< 0.001

Note: The table reports unstandardized OLS regression coefficients estimating the association between attitudinal variables and individual-level commitment to renewable energy adoption. Standard errors are reported in parentheses. Statistical significance is indicated at conventional levels. [Source: Own elaboration based on survey data (N = 417)].

As illustrated in Figure 4, acceptance of renewable energy shows substantial dispersion across the full range of perceived economic benefits. Respondents who evaluate the economic benefits of renewable energy similarly often exhibit markedly different levels of acceptance. Even at high levels of perceived economic benefit, acceptance does not converge toward uniformly high values, indicating that positive economic evaluations are neither sufficient nor decisive in isolation. This visual pattern is consistent with the bivariate regression results and suggests that the influence of economic perceptions depends on additional attitudinal factors. To further assess whether the role of economic perceptions varies across broader attitudinal contexts, acceptance was examined jointly across perceived economic benefits and attitudinal cluster membership. The results of this combined analysis are presented in Figure 5.

Figure 5 indicates that individual-level acceptance of renewable energy varies more strongly across attitudinal clusters than across levels of perceived economic benefit. Within clusters, differences in economic perceptions remain modest, whereas acceptance levels differ substantially between clusters, even when perceived economic benefits are comparable. This pattern suggests that economic considerations operate primarily as a conditional factor, with their influence depending on the presence of supportive environmental attitudes and favorable energy security perceptions. Interpreted alongside the regression results, the figure-based evidence clarifies the role of perceived economic benefits in shaping acceptance. Perceived economic benefits do not exert a strong independent influence in bivariate analyses, but they emerge as a central determinant of individual-level acceptance within a multivariate attitudinal framework. By contrast, energy security-related considerations do not display a statistically significant independent association with individual-level acceptance in the multivariate model. Hypothesis 2, therefore, receives partial support: economic perceptions shape individual-level renewable energy acceptance primarily within broader attitudinal configurations rather than as standalone drivers. Although general societal acceptance was included as an input in the cluster analysis to capture overall attitudinal configurations, subsequent analyses focus on comparing acceptance levels across clusters for descriptive and interpretative purposes rather than for causal inference.

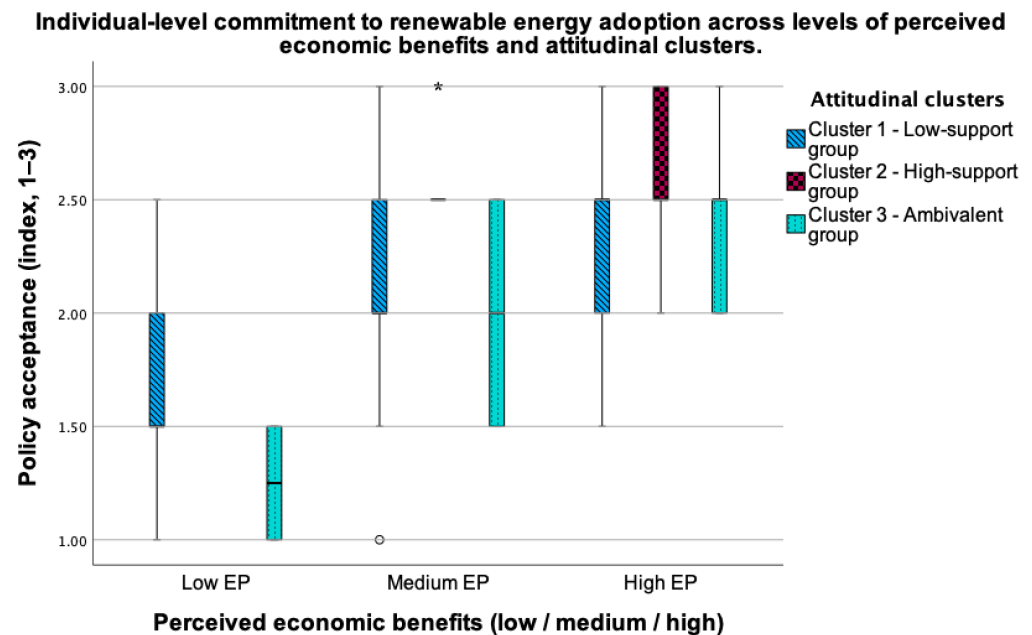


Figure 5. Individual-level commitment to renewable energy adoption across levels of perceived economic benefits and attitudinal clusters. Note: Boxplots show the distribution of policy acceptance across low, medium, and high levels of perceived economic benefits, separately for each attitudinal cluster. The figure illustrates how policy acceptance varies jointly by economic perceptions and attitudinal cluster membership. [Source: Own elaboration based on survey data (N = 417)]. “*” corresponds to the default SPSS boxplot notation for extreme values.

5. Discussion

This study examined public acceptance of renewable energy using a multidimensional analytical framework that explicitly distinguishes between general societal support and individual-level commitment. Based on survey data collected in Hungary, a post-socialist and energy import-dependent context, the analysis explored how environmental attitudes, perceived economic benefits, and energy security considerations interact to shape acceptance patterns within the observed sample. By combining descriptive statistics, regression analysis, and cluster-based approaches, the results contribute to international debates on renewable energy acceptance by highlighting the importance of attitudinal configurations rather than isolated determinants [42]. Three interrelated empirical insights emerge, each with theoretical and comparative relevance.

5.1. The Acceptance Gap Between Abstract Support and Individual-Level Commitment

A central finding is the identification of a pronounced acceptance gap between abstract societal support for renewable energy and willingness to adopt or invest in it. While respondents in the sample tend to express relatively strong endorsement of renewable energy as a collective objective, this support weakens substantially when translated into individual-level commitment. This divergence points to a structural disconnect between normative approval and behavioral readiness, reinforcing the view that public acceptance cannot be treated as a uniform or linear construct [43]. Comparable gaps have been documented in Western European contexts, where high levels of societal support coexist with local opposition to specific projects or limited household-level adoption [44]. The patterns observed in the present sample suggest a different configuration. Rather than being driven primarily by local siting conflicts, the acceptance gap appears to be associated with broader concerns related to affordability, uncertainty, and perceived feasibility [45]. This distinction is relevant for comparative research, as it indicates that the mechanisms underlying accep-

tance gaps may vary systematically across institutional and socio-economic settings [46]. By empirically demonstrating an acceptance gap within a post-socialist, energy import-dependent context, the study extends existing research beyond its predominant Western European focus [47]. The results indicate that acceptance gaps are not confined to decentralized or highly participatory energy systems but may also characterize more centralized governance environments, albeit shaped by different underlying concerns [48].

5.2. The Conditional Role of Perceived Economic Benefits

A second key insight concerns the role of perceived economic benefits in shaping acceptance of renewable energy [49]. The empirical results indicate that economic perceptions play a differentiated role across analytical contexts. In bivariate analyses, perceived economic benefits show only a weak and statistically nonsignificant association with individual-level commitment. However, once environmental attitudes and energy security considerations are examined jointly in a multivariate framework, perceived economic benefits emerge as a strong and statistically significant predictor of individual-level commitment, whereas the other attitudinal dimensions do not exhibit independent effects [50]. This contrast suggests that economic perceptions do not operate as a uniform or standalone driver of renewable energy acceptance. Instead, their explanatory relevance becomes visible only when individual evaluations are situated within a broader attitudinal structure. This interpretation is consistent with broader evidence indicating that economic considerations related to energy use and efficiency are mediated by contextual uncertainty and cost-related constraints, which shape how economic evaluations translate into individual-level acceptance [51]. The combined regression and figure-based analyses indicate that favorable economic evaluations contribute to higher levels of individual-level commitment primarily when other attitudinal orientations do not exert countervailing effects. In this sense, perceived economic benefits function as conditional or enabling factors rather than as primary determinants of acceptance [52]. The dispersion observed in the bivariate relationship further supports this interpretation. Individuals expressing similar evaluations of economic benefits often display markedly different levels of commitment, indicating that positive economic expectations alone are insufficient to generate consistent acceptance outcomes. This pattern helps explain why policy instruments relying predominantly on financial incentives may produce heterogeneous and unstable responses in practice [53]. Economic considerations appear to shape acceptance most effectively when they align with broader attitudinal configurations that support engagement at the individual level.

5.3. Attitudinal Constellations and Heterogeneous Acceptance Patterns

The strongest empirical support emerges for the proposition that acceptance of renewable energy is structured by distinct attitudinal constellations [54]. The cluster-based analysis demonstrates that acceptance levels vary systematically across groups defined by different combinations of environmental attitudes, perceived energy security, and perceived economic benefits. Importantly, these differences cannot be attributed to variation along any single attitudinal dimension [55]. High levels of individual-level acceptance are observed only in clusters where strong environmental concern coincides with favorable perceptions of energy security. This pattern indicates a reinforcing interaction between normative orientations and strategic considerations. Clusters characterized by partial alignment—such as relatively strong environmental concern combined with weaker energy security perceptions or ambivalent economic evaluations—exhibit substantially lower acceptance levels, even when one attitudinal dimension is favorable. The results further indicate that perceived economic benefits alone are insufficient to compensate for weak environmental or security-related orientations. Although economic perceptions contribute

to acceptance within certain attitudinal configurations, clusters with moderately positive economic evaluations nevertheless display low acceptance when other dimensions are misaligned. This finding reinforces the interpretation that acceptance emerges from the interaction of multiple attitudes rather than from additive effects of isolated beliefs [56].

By highlighting the configurational nature of acceptance, this analysis advances a multidimensional understanding of public responses to renewable energy. Acceptance is shown to depend not only on the strength of individual attitudes but also on how these attitudes are combined within broader evaluative structures. This perspective provides a basis for interpreting why aggregate levels of support may mask substantial heterogeneity in individual-level engagement.

5.4. Implications for International Comparisons of Renewable Energy Acceptance

The findings highlight the limitations of relying exclusively on aggregate indicators of public support in comparative research on renewable energy acceptance. While average acceptance levels offer a useful descriptive benchmark, they provide limited insight into how acceptance is structured at the individual level. The present analysis demonstrates that relatively high levels of general societal support may coexist with substantially lower levels of individual-level commitment. This pattern indicates that acceptance cannot be adequately captured by single summary measures. The observed patterns suggest that meaningful comparison across contexts requires attention to the internal structure of acceptance rather than to aggregate levels alone. Distinguishing between general societal support and individual-level commitment is essential for identifying acceptance gaps and for understanding how abstract endorsement translates, or fails to translate, into personal engagement. Without this distinction, comparative analyses risk conflating normative approval with behavioral readiness. In addition, the results underscore the analytical value of examining acceptance through attitudinal configurations. The cluster-based findings indicate that acceptance emerges from specific combinations of environmental attitudes, economic perceptions, and energy security considerations. Comparative research that focuses solely on individual predictors may therefore overlook important structural differences in how acceptance is constituted within populations.

By emphasizing acceptance dimensions and attitudinal constellations, the present study points toward a more differentiated comparative framework. Such an approach allows researchers to move beyond ranking contexts by average support levels and instead to examine how distinct attitudinal structures shape individual engagement with renewable energy transitions.

5.5. Limitations and Future Research Directions

Several limitations of the present study should be acknowledged. The empirical analysis relies on a non-representative online survey sample. Although the dataset exhibits sufficient attitudinal heterogeneity to support multivariate and cluster-based analyses, the findings cannot be generalized beyond the observed sample. The results should therefore be interpreted as analytically informative patterns that describe relationships between attitudes and different forms of renewable energy acceptance within this specific empirical setting. The cross-sectional design of the study constrains causal interpretation. While systematic associations are identified between environmental attitudes, perceived economic benefits, energy security perceptions, and renewable energy acceptance, the temporal ordering of these relationships remains indeterminate. Longitudinal or panel data would be required to examine how acceptance gaps evolve over time and how changes in economic conditions or policy environments influence individual-level commitment. Renewable energy acceptance is measured using self-reported attitudinal indicators rather

than observed behavior. Although the distinction between general societal support and individual-level commitment represents a conceptual contribution, further work could complement survey-based approaches with behavioral data, such as actual investment decisions or participation in renewable energy programs, to capture more directly realized forms of engagement. Future research may extend the present framework by applying it to additional institutional or policy contexts and by employing comparative designs that emphasize acceptance dimensions and attitudinal configurations. Qualitative approaches could further deepen understanding of how individuals interpret economic risks, energy security considerations, and environmental responsibilities in everyday decision-making. Such extensions would contribute to a more refined analytical understanding of renewable energy acceptance and support the development of context-sensitive strategies for fostering individual-level engagement.

6. Conclusions

This study examined public acceptance of renewable energy through a multidimensional analytical framework that distinguishes between general societal support and individual-level commitment. Focusing on the Hungarian context as a post-socialist and in an energy import-dependent setting, the analysis explored how environmental attitudes, perceived economic benefits, and energy security considerations jointly shape acceptance patterns. Using survey-based data and applying descriptive analysis, regression models, and cluster-based methods, the study provides empirically grounded insights into renewable energy acceptance and the persistence of acceptance gaps.

With respect to the proposed hypotheses, the results point to clear and differentiated outcomes. Hypothesis 1 is supported by the identification of a pronounced acceptance gap between abstract societal support for renewable energy and willingness to engage in personal adoption or investment. Although general support levels are relatively high, individual-level commitment is substantially lower and more heterogeneous, indicating that normative endorsement does not translate automatically into behavioral engagement. Hypothesis 2 receives partial support. While perceived economic benefits do not exhibit a strong explanatory role in bivariate analyses, they emerge as a statistically significant and substantively relevant predictor of individual-level commitment once other attitudinal dimensions are included. In contrast, environmental attitudes and energy security considerations do not display statistically significant independent effects in the multivariate models. Hypothesis 3 is strongly supported, as renewable energy acceptance differs systematically across attitudinal clusters defined by distinct combinations of environmental attitudes, perceived energy security, and economic evaluations. Acceptance is highest in clusters characterized by the joint presence of strong environmental concern and positive energy security perceptions, whereas clusters lacking this alignment exhibit substantially lower acceptance levels. From these findings, three broader implications emerge:

- *Acceptance gaps are structurally embedded.*

The results demonstrate that gaps between general support and individual-level commitment are not marginal or random but reflect qualitatively different attitudinal configurations. High societal endorsement of renewable energy can coexist with limited personal engagement when concerns related to feasibility, risk, or strategic relevance remain unresolved. This highlights the need to conceptualize acceptance as a multidimensional phenomenon rather than as a single continuum.

- *Economic incentives alone are insufficient.*

Although economic considerations are frequently emphasized in policy discourse, the analysis shows that perceived economic benefits do not independently drive acceptance.

Financial incentives may facilitate engagement under favorable conditions, but they cannot compensate for weak environmental orientations or limited perceptions of energy security benefits. This finding underscores the limitations of narrowly incentive-based approaches to increasing renewable energy adoption.

- *Alignment of environmental and energy security narratives is crucial.*

The highest levels of acceptance emerge where environmental concern and perceived energy security benefits reinforce each other. This indicates that successful energy transition strategies require integrated narratives that link sustainability goals with long-term system resilience. Policies and communication strategies that address only one of these dimensions are unlikely to generate broad and durable individual-level commitment.

In light of these findings, this research contributes to international debates on renewable energy acceptance by demonstrating that acceptance gaps are shaped by context-specific attitudinal structures rather than by uniform economic rationality. By moving beyond aggregate measures of support and highlighting the configurational nature of acceptance, the study provides evidence-based guidance for designing more effective and socially grounded renewable energy policies, particularly in post-socialist and energy import-dependent contexts.

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